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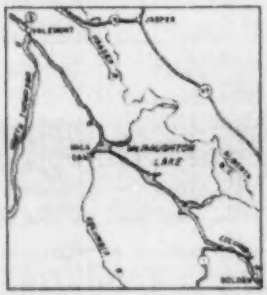

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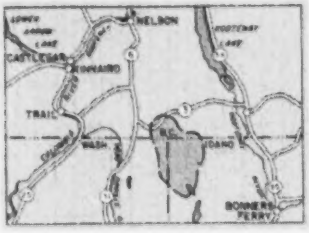

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ForesTalk FALL 1974

THE GOVERNMENT OF
THE PROVINCE OF BRITISH COLUMBIA

DEPARTMENT OF LANDS
FORESTS AND WATER RESOURCES

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Policy Statement

The objective of the British Columbia Forest Service, as the forest administrative agency for the government of British Columbia, is to develop and enforce policies which will ensure for all time the proper balance of timber supply, forage production, forest recreation, wildlife protection and environmental preservation on the Crown forest lands of the province.

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TO EAT OR NOT TO EAT

Mushroom Dilemma

by

ADAM F. SZCZAWINSKI
Curator of Botany, Provincial Museum, Victoria, B.C.

MORCHELLA ANGUSTICEPS, are delicious.

Edible CANTHARELLUS CIBARIUS.

TRICHOLOMA PERSONATUM, is edible.

Edible "Shaggy Mane", COPRINUS COMATUS.

Each Fall, following periods of warm rain, hundreds of outdoor enthusiasts set out for the woodlands and meadows seeking mushrooms. With food prices soaring, more and more of these enthusiasts are plainly "food hunters" who have prospects of delicious food in mind. And, of course, there are always those far-out types who will try anything for kicks not realizing the price to be paid in the form of severe illness or death.

Mushroom hunting is not only a form of recreation but also a game with its own code of ethics. You have the satisfaction of finding better and more than the others, and you don't tell them where you got yours. Such a game could be fun but it could also be dangerous unless you know for sure that the kind you pick are edible. It is not safe to pick a mushroom just because that kind has been nibbled by squirrels or slugs. It is false to believe that edible mushrooms will "peel" or that poisonous mushrooms can be detected by the fact that when cooked they will turn silver black, turn parsley leaves yellow and onions brown or bluish. It is proven scientifically that no one of these, not all of them put together will serve to separate the poisonous from the edible. There is no short cut, no rule covering them all the only approach is to know them and to know them for sure.

Mushrooms are an amazing tribe whose fascinating properties are only just beginning to be discovered. They belong to a group of plants, the fungi, with some hundred thousand species ranging in size from microscopic yeast and miraculous molds to giant puffballs and cauliflower mushrooms, reaching a size of 20-25 pounds quite commonly. The group touches upon human activities in a surprising number of ways, playing an important part in the process of decay, alcoholic fermentation, and in causing a number of diseases in plants, animals and man.

The ignorance of the average person concerning such common things as mushrooms is truly remarkable, and confusion still exists concerning the term "mushroom" and "toadstool". In many regions "mushroom" is applied only to the common meadow mushroom and its cultivated relative, while in others, "mushroom" is used for all edible species and "toadstool" has no botanical meaning, it is much better to speak only of "mushrooms", some of which may be edible, some poisonous and others undesirable for human consumption.

Most people never see the mushroom plant - the part they see is its fruit. The vegetative part of the plant which produces the fruit is a delicate thread-like structure growing either within the soil in decaying wood or in any other substratum in which the fungus can thrive. This vegetative part known to commercial growers as "spawn" and to botanists as the "mycelium" starts from a microscopic spore.

Although mushrooms do not compare with meat as a source of protein, a chemical analysis provides evidence that they indeed do have some food value. In general, water content is up to 90%, protein up to 3½, fat up to 0.5½, carbohydrates as much as 6½ and minerals about 1½. The caloric value of mushrooms is rather low, roughly 30 calories per 100 grams (¼ lb.). They compare favourably with most vegetables as to their nutritive value and vitamin content.

Mushrooms have been eaten for a good many thousands of years commencing in a time when no one seemed to know what a mushroom really was and how it came to be. The culinary possibilities of mushrooms have been exploited for centuries in Europe and the Orient, but we North Americans are notoriously suspicious of any mushrooms collected in woods or fields. We let the reputations of a few poisonous species deprive us of the enjoyment to be found in the hundreds of highly edible and completely safe kinds of mushrooms. It doesn't really take much training to become acquainted with a few good edible species, to be able to recognize them on sight, just as one can learn to recognize any other wild fruits. By learning a few unmistakable, safe mushrooms like Shaggy Mane, Yellow Chanterelle, Blewit or Puffballs, one discovers the pleasure of providing a delicious stimulant to a jaded palate and an adventure in cooking.

Relatively few of about 3000 species of mushrooms in the Pacific Northwest are actually deadly poisonous. In British Columbia two species are responsible for most of the known cases of poisoning. One, Amanita pantherina - the Panther Amanita - is common on southern Vancouver Island and on the Gulf Islands and can be found from April to Autumn. The other, Amanita muscaria - the Fly Amanita or Fly Agaric - is generally found in the Autumn throughout the province. Amanita pantherina and Amanita muscaria could be killers and there is only a short lapse of time between ingestion of these mushrooms and the appearance of symptoms. Muscle spasms, excitement, hallucinations, and behaviour suggesting alcoholic intoxication are the typical symptoms. Death is more frequent in cases of Amanita pantherina as this is a much more toxic species. "If a mushroom displays white warts on cap, white gills, a ring or veil on the stem below the cap, and a distinct cup (volva) from which the mushroom grows, it should be avoided." Collecting mushrooms is fun. Try it.

CORTINARII are often common during the early fall.

Slash Burning

Effective, Economical
And Sometimes Controversial

Unlike the incredible destruction brought about by forest fires, slash burning or prescribed burning, used under controlled circumstances, is essential in the production of healthy, serviceable forests. Its use has been discussed publicly on many occasions by experts, as well as those who are merely expressing their opinion. As a result, the issue has become clouded. Here, to dispel myth and present fact, slash burning, its use and effect, is described from three points of view by well informed sources on the subject.

In some areas, it is environmentally sound to burn forest litter

A forest is more than merely a lot of trees. It is a complex collection of interacting and interdependent plants, animals and microbes living in intimate association with the soils, water and climate of the areas. Because their constituent components vary tremendously from place to place in B.C., so the character of our forests is highly variable. This requires that forests of different character are managed in different ways.

The Problem of Slash

Of the many problems that confront a forester, the disposal of large quantities of post-logging debris has always been a controversial one. Logging debris, or slash as it is called, poses many problems. It can inhibit natural reinvasion of trees. It can make planting difficult or impossible, and it can constitute a severe fire hazard.

Heavy slash is ugly to look at, and by delaying regrowth of the forest it can prolong the ugly-duckling stage of forestry.

These and many other arguments establish indisputably that under some conditions, slash poses a variety of intractable problems that must be solved if management for tree growth is to be successful.

Slash Burning as a Method of Slash Disposal

Disposal of slash by fire has long been considered the only practical way of doing the job. There are several arguments in favour of this method, and on some types of

by

J.P. KIMMINS, Ph.D.

Associate Professor
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forest site it is probably the best method from both a managerial and environmental standpoint. There is an urgent need to make the application of this technique more flexible, however, because its effects are very undesirable on some types of forest land.

The effects of slash burning on soils, on regrowth of the forest, on water and fish, and on wildlife has received a lot of attention and yet our knowledge of the long-term consequences of slash burning on any specific area is still incomplete. We can, however, make certain generalizations, recognizing that they are only true for certain types of forest, and under certain conditions.

Slash burning generally aggravates the undesirable effects that logging can have on streams. Siltation, excessive summer heating of streams, and excessive increases in concentrations of dissolved chemicals often have deleterious consequences for fish and the quality of water.

One of the main reasons for slash burning is a reduction of fire hazard in order to protect adjacent areas of forest from fire. However, slash burning has frequently resulted in the fire spreading to adjacent forests. Sometimes the "escapes" are limited in area but they are frequently quite substantial, and occasionally they assume major proportions.

Conclusion

The complex variety of British Columbia's forest resource defies any simple yes/no decision on the question of slash burning. It is a question of where, when and how. There are many types of forest that are commonly slash burned for which I believe slash burning is the wrong solution to the problem of slash. The evidence, albeit incomplete, indicates that the benefits of slash burning on such sites are outweighed by the disadvantages. There are other types of forest, however, for which slash burning can be very beneficial to the forest, while at the same time doing little or no environmental damage. There are yet other types of forest in which slash burning can be either good or bad, depending on when and how it is done.

I believe that slash burning should remain as an option available to foresters as a means to solving certain types of problem conditions. However, I feel that decisions on slash burning must be made in a far more ecologically rational manner than they have in the past, that the decision must be based on an understanding of the character of the land and the way in which it will respond to slash burning. In those situations where we do not have enough knowledge of the effects of slash burning or alternative means of slash disposal to make wide decisions, it is the responsibility of the Forest Service to ensure that appropriate knowledge is obtained through research.

Nature has conducted her own slash burning since the beginning of time

by

A.B. MITCHELL

Protection Division
B.C. Forest Service

To discuss slash burning, we must take a look at the role of fire in the forest ecosystem. This is important because Mother Nature has arranged a marvelously complex ecosystem without the benefit of consultation with any "experts". We must remember that once involved in resource management systems, which are different from those used by nature, we can get into serious trouble.

An ecosystem is a highly complex interacting community of living and non-living components which all contribute to the basic system - that of the entry and movement of energy and of nutrient cycles. In a typical forest ecosystem this energy can accumulate over many years in the form of annual tree growth and be held out of the nutrient cycle for a considerable period.

When energy continues to accumulate, it is obvious something must be done to release it back into the nutrient cycle. In our temperate climate, nature takes care of this by using fire which is really nothing more than an acceleration of the decomposition process. As a forest ages, accumulation of dead trees and litter allow lightning fires to spread more extensively until the old forest is re-converted to its original components - water, carbon dioxide and minerals - needed to grow a young, vigorous forest.

In terms of ecological evolution, then, fire puts the site back in succession and this has a profound effect on the plant community - this effect varying from plant to plant and being "good" or "bad" depending upon your particular interests.

When we log and burn an area, we are attempting to replace nature's system of reducing the volume of accumulated energy and setting back the succession by fire with a system which permits us to extract a portion of that energy in the form of wood products, and then utilize fire when necessary to get the site back to just the right place in succession. We must do this without taking too much energy out of the system and without damaging the soil resource which, of course, is the basic resource upon which all wildland value is dependent.

On some logging sites it is essential that we eliminate the "fire" stage of forest renewal to offset the removal of nutrients caused by wood fibre removal. Eliminating the "fire" stage in some other forest ecosystems, however, can often have a detrimental effect. We must be careful about what is substituted in nature's proven system of using fire to remove excess energy. The soil must blacken sufficiently to absorb enough warmth for a new crop to generate, and expose the germinants to just the right amount of sunlight in their early years.

Slash burning, when used for the purpose of providing the right ecological conditions vital to a new crop, or producing moose browse, or further, to reduce insect and disease problem, is **usually** the right treatment, because it is close to nature's way. We must not use it simply from tradition or because it is cheaper. We should burn slash when - and only when - burning slash is the best treatment for that particular site.

The public must be given what they have every right to expect - the maximum social and economic benefit from the forest. If non-blackened forest sites and air without woodsmoke which have been an integral part of our ecosystem for thousands of years are now deemed by the public to be socially undesirable, we resource managers must provide first class substitutes for fire. We can do this, but the cost is high and the chances of permanent damage to the soil base are high.

Conflicts in the use of prescribed fire in the forest ecosystem, then, are really conflicts in the use of land. Fire may be unsightly, but it is good for the ecosystem. A half rotten burned log may not be the ideal place to eat your picnic lunch but is an excellent spot place for a seedling to germinate. A logged and burned hillside may be a poor backdrop for a snapshot of your family with your new camper, but it can be an excellent game browse area.

I believe we can **carefully** extract stored forest energy in the form of wood products, to enhance the social and economic opportunities for our citizens and that fire can often be used as a tool to return such areas to near-normal ecological conditions.

A cleared and burned area is not pretty to look at (above) but a healthy usable forest is the end result. (left)

To paraphrase Mackenzie King, burn if necessary, but not necessarily burn. That quite simply states the position of the modern industrial forester on the subject of slash burning.

Prescribed burning, as it is known in the forest industry, is an essential forest management tool which must be part of the bag of tricks an industrial forester has at his disposal. And, not unlike a medical doctor treating a patient, the forester must be in a position to decide which treatment, or combination of treatments, is most appropriate for promoting healthy and vigorous growth in forests.

In the past, slash burning was used primarily to reduce the danger of a wild fire catching in the debris left over from logging, and then spreading to the surrounding stands of trees. In other words, it was an attempt to accomplish, under controlled circumstances, what nature would probably do by itself. It often didn't work out that way, however. Today, slash burning is also used to prepare a logged-over area for replanting.

Fire hazard is just one of many factors which are considered before deciding whether or not putting a torch to logging debris is the best answer for any given forest area. Even potential fire hazard itself isn't enough, because, when a forester has at his disposal adequate means for fighting fires, the decision to burn must be tempered with other values.

Aside from the nuisance of heavy smoke, the deliberately set fire in logging slash can

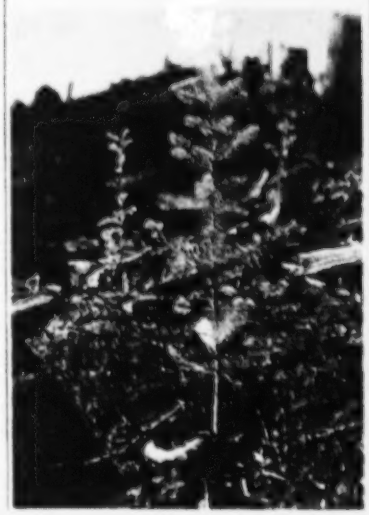
by

THE COUNCIL OF FOREST INDUSTRIES

sometimes have a negative effect on the ability of the land to grow a new forest.

So, before a decision is made on how best to rehabilitate a logged-over area, a forester reviews a complex list of factors. Some of the more important questions to be considered are as follows:

- Is the accumulation of slash, decaying organic matter, and brush too deep to allow new seedlings to be established?



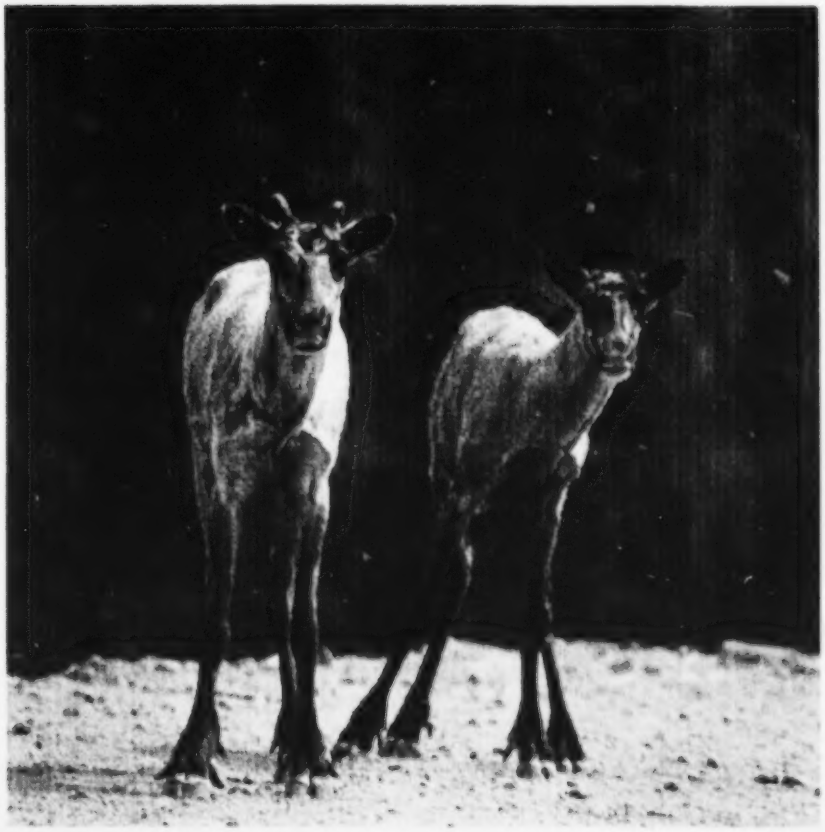
- Is there a danger of insect or disease infestations in the slash contaminating the young seedlings?
- Is the soil too thin and fragile to allow use of fire?
- High elevation areas sometimes require protection from erosion by leaving slash on the ground.
- Do the terrain conditions make it difficult to control a prescribed fire?

If the decision is to burn, there is a limited time available during each season when controlled burning is both safe and possible. This time period has traditionally fallen in September. One of the reasons which makes this time period safe - stable atmosphere - also contributes to the layers of smoke which persist over wide areas during the fall.

However, science is coming to the rescue with ways in which the smoke concentration can be significantly reduced. By closely studying how fast the slash dries in the spring, researchers have found about 20 days between May 1 and July 31 when the debris is dry enough to burn, but not so dry that there is danger of the fire escaping to other areas.

In summary, an industrial forester requires the freedom to give the best possible treatment to promote regeneration of a logged-over area. No two areas are exactly the same. Prescribed burning is just one of the many forest management tools the industrial forester wants at his disposal. He wants to burn if necessary, but won't necessarily burn.

Woodland Caribou



An International Effort To Save Their Habitat

by **A.G. DAGG**

Concern for the survival of a dwindling herd of about 25 woodland caribou is being eased by co-operative action of forest managers on both sides of the Canada-United States border.

The animals in question roam at random throughout that part of the Selkirk Mountains known as the Nelson Range, embracing parts of Washington, Idaho and British Columbia. They are believed to be the most southerly herd of the species and probably the only one which enters the U.S.A.

Although wildlife authorities have enforced some protective measures as early as 1917, there are indications that some illegal hunting has occurred and logging has damaged the habitat. To identify the problems and promote remedial action, the Canada-U.S. Steering Committee for the Co-operative Study of Caribou was established in 1971 and partly as a result of its findings and recommendations, positive steps are now being taken to preserve the Selkirk herd and its habitat.

Habitat

Woodland caribou, often called mountain caribou, normally live between the 4,600 and 6,800 foot levels. They feed on a variety of plants when snow is absent or light, but when the snow deepens they rely on arboreal lichens which grow best in mature stands of sub-alpine fir and Engelmann spruce.

Mature animals weigh from 150 to 400 pounds, with males being the larger. When three years old, the cows normally drop their first calf and they usually produce one each year.

Within B.C., many small herds of woodland caribou are scattered throughout the Selkirks, Purcells and as far north as Wells Gray Park where there are about 350. However, based on the best information available, wildlife authorities believe that only the one herd now makes occasional visits to the contiguous United States region from the more widely used part of its habitat in the West Kootenays.

Migration

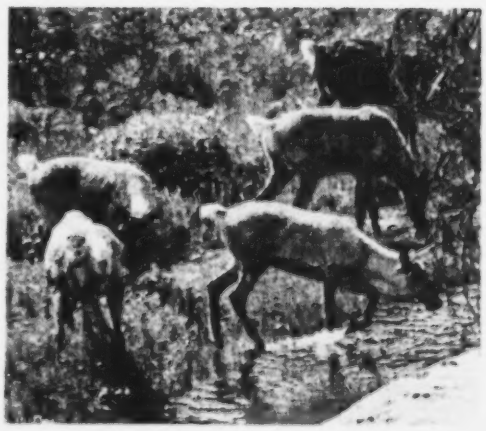
Most southerly reported sighting of the species was made in 1832 when caribou were seen about 300 miles south of the international boundary in Idaho. Other identifications recorded before 1900 include several in Montana, Idaho and Washington. However, more recent sightings clearly indicate a diminishing population in the U.S.A. and a gradual retreat of the survivors to the north.

Studies conducted within the past few years reveal that penetrations into the U.S. do not follow any seasonal or even annual schedule, are probably made in search of food when it becomes scarce in the Canadian part of the herd's habitat and seldom exceed 30 miles in depth. In this regard, the U.S. Department of the Interior officially classified woodland/mountain caribou in 1973 as a "peripheral species" but "not endangered". Nevertheless, appeals to safeguard the species, particularly the so-called Selkirk herd, have been made on both sides of the border.

A Complete Study

As the provincial government's administrative agency for the Crown forest lands of B.C., the Forest Service has accepted a responsibility to assist in maintaining the herd and its habitat. For a start, it engaged wildlife biologist David J. Freddy, probably the best authority there is on the habits, needs and movements of these animals.

He was born in Illinois in 1949, received his B.Sc. in wildlife biology at Colorado State University and obtained his master's degree in zoology at the University of Idaho early in 1974. During his studies, he devoted over two years to field research on the Selkirk caribou herd in both the U.S.A. and Canada.



Mr. Freddy was employed by the Forest Service to review existing logging plans in the B.C. portion of the herd's range and recommend adjustments which would ensure the maintenance of the caribou habitat. In addition, he was to propose long term constraints for future logging.

Vast Area Studied

Mr. Freddy examined nearly 45,000 acres of forest land within the B.C. region of interest and found that feeding areas and movement corridors used in varying degrees by the herd covered about 10,000 acres.

Of this, nearly 3,400 acres contain commercially usable mature timber, half of which probably would have been logged by conventional methods within the next few years. Most of the mature timber is located in valley bottoms and stream headwaters between 5,000 and 6,000 feet above sea level.

Having determined that logging can be an obvious conflict with the caribou and that logging roads often lead to illegal hunting and critical disturbances of the animals, Freddy advocated complete elimination of logging in some parts of the critical areas, rearrangement of cutting patterns in others and a general reduction in the size of clear-cut areas where they will be permitted.

Co-operation Is The Key

Although implementation of the recommendations means a reduction in the amount of timber to be harvested, dislocation of several logging operations, increased logging costs and some loss of revenue for the Crown, the Forest Service has given virtually full support to the proposals.

David Freddy's report and subsequent Forest Service action have been warmly endorsed by the Fish and Wildlife Branch of the Department of Recreation and Conservation as well as some leading local members of the B.C. Wildlife Federation. In this regard, Habitat Protection Officer for the Nelson Region of the Fish and Wildlife Branch, Ken Sumanik, once very concerned for the future of the herd, is now "modestly optimistic".

Time Required

"Only through continual observation of the animals can we determine changes in their well-being and numerical status but it may take up to 15 years for a positive trend to develop," he said.

Nelson District Forester Ralph Johnston supports Dave Freddy's report and sums up the situation in this manner: "The forests contain a number of resources. Increased or excessive emphasis on one often results in limitations or losses to another, but by striking a fair balance among all values, each can survive and prosper in its own way."

MICA DAM

by **RAY WORMALD**

A "bathtub ring" about 220 miles long? Some tub! Some ring!

Well, that's exactly what Forest Service people created while clearing land being flooded behind the Mica Dam 85 miles north of Revelstoke. The "tub" is the 135 mile-long reservoir now filling up behind the dam, and the "ring" is a wide swath of timber which has been removed from the top edges of most of the great, long valley.

When the reservoir is at its lowest level, any trees left standing underwater will be at least 20 feet below the surface. They will present no threat to navigation.

Wild Waters Tamed

Spring flood waters of the Canoe and Upper Columbia Rivers and their overflowing tributaries are now being controlled behind the Mica Dam. In past years these turbulent waters crashed down the river channel into the Arrow Lakes, and then southward to the U.S. border. In years of high run-off, and before construction of the Hugh Keenleyside, Duncan and Libby Dams, the mighty Columbia caused serious flooding and property damage. Sometimes even loss of life. Completion of the Mica Dam, however, with impoundment of flood waters behind it, marked the final step in taming the tempestuous waters of the Columbia River in B.C.

A great new lake, to bear the name McNaughton (after Canada's General McNaughton of World War Two fame), is arising behind the dam. It stretches 135 miles from Valemount southeast nearly to Donald Station.

The monumental and oft-times hazardous job of clearing the land to be flooded was assigned to the B.C. Forest Service. The total area of the reservoir will be about 105,000 acres, and of this, approximately two-thirds was forest cover.

Clearing operations actually started about 11 years ago when logging contractors removed a considerable amount of merchantable timber. Some additional clearing was done by B.C. Hydro.

100,000 Homes

So far, close to 100 million cubic feet of sound timber has been removed from the reservoir site - enough lumber to build 100,000 average-sized houses. In addition, many logs have been left on the ground . . . to be floated by rising waters of the reservoir for later salvage. Trees of no commercial value, along with deadfalls and slash are being piled and burned by Forest Service crews. The entire clearing operation is under the direction of Ted Szamecz (pronounced Sam-ek), of the Forest Service's Engineering Division.

A crew averaging 30 to 40 personnel has been working on the project for the past several years, operating from camps at Valemount, Mica Creek and Bush River.

Already there is a considerable quantity of floating debris on the huge new lake, and there will be more as waters continue to rise. This, too, is a big part of the Forest Service's job - to collect the floating debris, haul it ashore and dispose of it.

Total clearing will probably take several years after the full-flood level has been reached . . . and for this reason, during cleanup, the reservoir will not be suitable for boating or other recreational uses.

But after that, the vast waterway will provide access to a great wilderness region of truly spectacular beauty. The door will be open for development of rich resources and boundless recreational opportunities.

Access Plans

Access to the reservoir is planned initially from Valemount at the north end, from the site of the dam in the central portion of the reservoir, and from Golden in the south. Parking areas and boat launching ramps are planned for these points, together with other recreational facilities.

Several provincial recreation sites adjacent to the reservoir are being considered by the Forest Service, and priority will likely be given to an area near Red Rock Canyon just north of the dam.

Planning for Future

Although the actual reservoir project itself is nearing completion, much detailed study is being given to the future of the entire region. Resources Minister Robert Williams just two months ago released details of what was called the Mica Reservoir Region Resource Study. Among its many recommendations are those calling for management of the region's forests to assure that needs of other resource users are considered; introduction of secondary forest resource processing, land use zoning to protect the land base for forestry, recreation and wildlife, improvement of the area's highway system, and studies of areas for new parks.

Initially another major step in British Columbia's hydro-electric system, the Mica Dam and the development of its reservoir undoubtedly will result in a host of other values for the people of British Columbia.

Detonating Cord

New Development in a Never-Ending Battle

by G. GRAHAM

At one time, fighting forest fires meant employing every piece of equipment and able body in the community. Farmers with teams of horses and mules, townspeople and loggers with shovels, axes, or any other useful tool they could find in the shed, and groups of women turning out a constant supply of food for exhausted crews. Times have changed. So have the methods.

Today, as a result of research and technology, fire fighting incorporates a sophisticated system of observation and communication aimed at early detection, with a swift dispatch of trained crews. At the site, airtankers, helicopters, retardants, bulldozers, power pumps, chain saws, and tools are pressed into action. Tactics and equipment are persistently reviewed with the object of increased efficiency. One of the latest developments from the Protection Division of the B.C. Forest Service is an item called detonating cord.

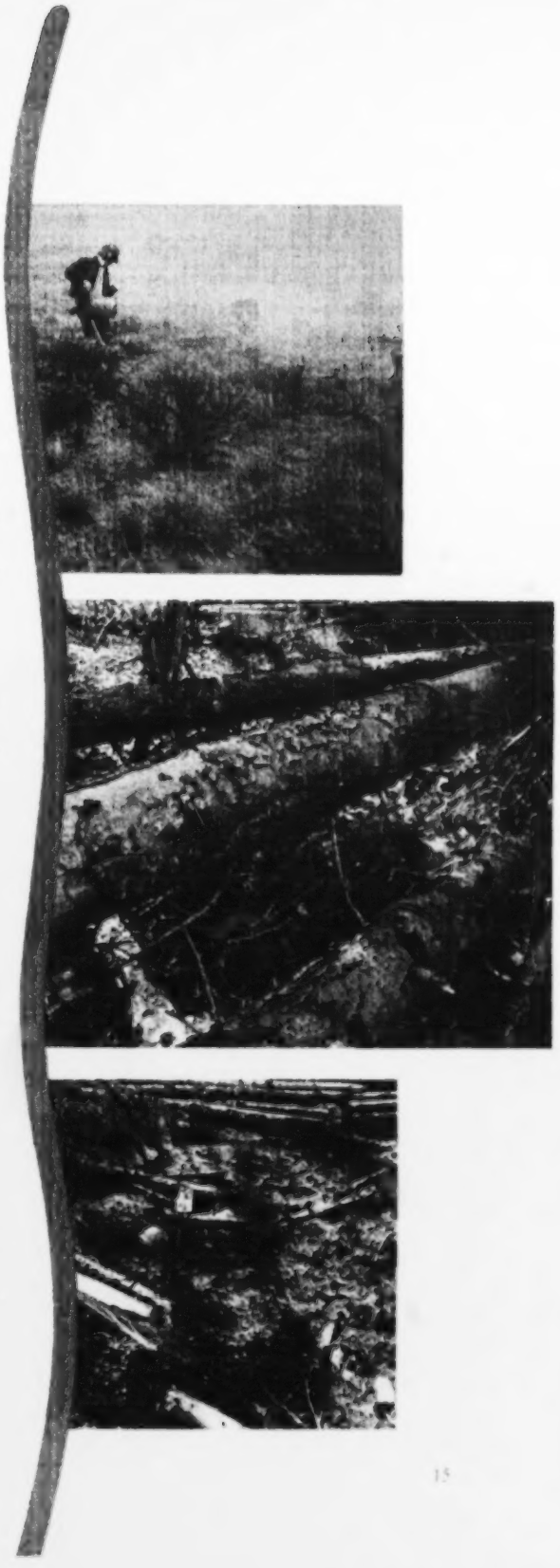
Detonating cord is used to make a fireguard. What is a fireguard? Quite simply, it is a path or swath cleared to mineral soil of any dead twigs, branches, logs and other organic "fuel". The object is to contain the fire and prevent further destruction. Once a fireguard has been established around the fire, the job of burning out and final mop-up begins.

The work on a fireline is hard and dirty. Every minute a man spends on the line, his efficiency decreases drastically and personal danger increases at the same rate. Therefore, any mechanical assistance capable of increasing efficiency is most welcome. Bulldozers are ideal, but not always available in the more remote areas. Guard construction then is left mainly to hand tools. Up to now, explosives were not practical in fireline use. Detonating cord appears to be the answer to many problems presented by other explosive systems. The advantages are nil or very low fire starts, faster construction rate, usable by small crews, straightforward procedures, and low environmental impact.

Detonating cord could almost be termed "dynamite in a cord". It consists of 840 grains per foot of explosive, wrapped with fire retardant and an outer shell of highly visible material. It comes in 200-foot lengths on a spool, with a total weight of only 47 lbs. The cord is laid along the intended fireguard. In some areas, two lines of cord are used when conditions warrant. Since electronic firing systems are subject to accidental discharge by radio transmitters or lightning, detonating cord is fired by cap and fuse. Once fired, the cord blasts a guard to mineral soil one to two feet in width and defoliates the brush to a width of four to eight feet. The reduction in costs when related to speed of guard construction is substantial.

Detonating cord isn't new to Protection Division personnel. They have been testing the device since 1972 under every conceivable condition to ensure effectiveness and safety. Along the way, they discovered a few additional applications like digging water holes for pumps, falling trees and breaking windfalls. The cord can be exposed to an open flame without exploding and this probably makes a few individuals breathe a little easier.

This summer, five small specially-trained crews worked in the field on a variety of forest fires, under many conditions. The results are now being studied to determine whether this potential fire-fighting tool can find a regular role.



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